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TROPICAL HOUSING & PLANNING

MONTHLY BULLETIN

for Dr. C. A. DOXIADES*

I. Current Literature

General	p. 1-3
Hot Dry Areas	p. 4-5
Hot Humid Areas	p. 6-8

II. Field Reports --

III. Special Articles p. 9-15

Pakistan. Planning Board. The first five year plan, 1955-60 (Draft), Vol II, Part 2. Karachi, The Board, May 1956. 1082 pages. Mimeographed.

Further information on any of the digests may be obtained on request by reference to the Bulletin no. and the item no. --i.e., 2.3 would refer to New Zealand. Minister of Housing. Housing 1955. Wellington, Government Printer, 1955. 38p., plans, tables, chart.

* This report has been compiled for private circulation only by Prof. J. Tyrwhitt, 77 Trowbridge Street, Cambridge, Mass., USA.

I. CURRENT LITERATURE

GENERAL

1. Bauer, Catherine. The pattern of urban and economic development: social implications. (In Annals of the American Academy of Political and Social Science, May 1956, vol. 305, p.60-69.)

This article is based on a study of urbanization and living conditions in underdeveloped areas now in preparation by Miss Bauer for the United Nations.

Miss Bauer points out that in most developing countries a period of rapid urban growth is imminent, that in fact the rate of urbanization is likely to be faster in most developing countries than it was in Europe or North America in the nineteenth century.

Living conditions in those fast-growing metropolises tend to be very bad. Densities are very high; one or two families per room is quite general, except for the well-to-do. In most cities improvements may be found but they are not keeping up with the influx, and over-allconditions are probably getting worse in many respects instead of better.

In discussing the relative advantages of the large city and the small decentralized town the author states that it costs more to achieve a given level of living in a large city than in a small town, and that the difference is likely to be greater in regions with backward technology and limited resources. Simple and relatively inexpensive transportation and utility systems adequate for a small town would not be adequate for a large city. The author goes on to say,

"Housing density is perhaps the key factor. Densities are always likely to increase with city size, and this is almost inevitable where inadequate services limit the supply of usable sites, and where land speculation is rampant. Land prices are disproportionately high in most of the burgeoning metropolitan centers, even in semisocialist countries. And exorbitant land prices (assuming the absence of confiscatory powers or subsudies) mean large crowded insanitary shacks or multifamily structures. But the latter, even at one family per room with shared sanitary facilities, are relatively expensive in underdeveloped countries because building technology is backward. Low densities, on the other hand, make possible an entirely different approach: cheap local materials, simple building methods, minimum utilities, unskilled labor, often on a "self-help" basis, and outdoor space which (particularly in mild or tropical climates) can make up for some of the other limitations. But even if low-density housing were possible on the metropolitan fringe, the problem of extending minimum services over a much wider area would probably prohibit any general solution by this means.

A single illustration must suffice. The price of a tenement dwelling in Bombay (including land) is likely to be three times as much as for equal or better accommodation in an outlying house, and the cash cost of the latter could probably be halved if the owner contributed labor. But the high cost of adequate transportation precludes much suburban development for ordinary workers as long as most of their jobs are in central districts.

It is therefore no accident that the most promising housing and community betterment schemes are not found in the big cities, as a rule, but in rural villages where 'aided self-help' and 'community development' programs have taken hold. Here real though modest physical improvements can apparently be made, with minimum cash expenditures and without complex administrative or service machinery."

2. Hoyt, Elizabeth E. The impact of a money economy on consumption patterns. (In Annals of the American Academy of Political and Social Science, May 1956, vol. 305, p. 12-22.)

This article in the issue of the Annals, entitled "Agrarian societies in transition," contains a one-half page section on housing. This section follows in its entirety.

"Housing

In the area of housing the weight of evidence is not so strongly on one side as it is in the case of food. According to circumstances, both improvement and deterioration take place. So long as people can live in their own native habitat, changes tend to be for larger space, better construction, and more amenities; but these changes come slowly. On the other hand deterioration comes rapidly when workers move themselves, and especially their families, to centers of industry. There is no worse housing in the world than in the slums of many Asian and African cities. Flimsy construction, as of cardboard and tin, terrific crowding, the absence of elementary sanitation, and the presence of insects and rodents--all these distinguish the kind of houses in which many workers have to live when industry expands. A great deal has been written on experiments in good housing for underdeveloped peoples as they come to new centers of labor, and there are many such experiments under municipalities and employers, but compared to the need for them they are numerically unimportant. What is also little

recognized is the fact that employers of labor in providing 'good' housing often pay little attention to what workers want; for example, they substitute identical rows of rooms for separate huts, thus depriving families both of privacy and of the opportunity to have in their homes a little variety and expression of personal taste. So the values gained by better construction and equipment, when these are given, may be more than off-set by the fact that the new houses do not accord with the families' living habits and interest in their home."

HOT DRY AREAS

3. Robinson, Harold. Israel's expansible house assures basic shelter now, amenities later. (In Journal of housing, May 1956, vol. 13:5, p. 172-174, with photos, plans.)

Climate: circa 108°F-25°F
Rainfall: circa 25"

A photostatic copy of this article is attached.

4. Sanderson, George A. Chandigarh, a progress report. (In Progressive architecture, Mar. 1956, vol. 37:3, pp. 130-137; with photos., plans.)

Population: 50,000
Climate: (84°F summer (55°F winter
Rainfall: 30"

The article starts with a history of the design beginnings of the new capital, which contributes nothing beyond information given in other Chandigarh articles previously summarized.

The base of the city plan is a rectangular grid of heavy traffic roads enclosing self-contained neighborhoods (called sectors), each about 3/4 of a mile long by a half mile wide. Population of the various sectors ranges from 5,000 to 15,000 persons. The road and sector system almost completely separates vehicular and pedestrian traffic. Each sector is divided transversely by a shopping street, and longitudinally by a park lot-- the site of schools nurseries, community center, etc. The sectors are interconnected by the shopping street, running across, and by park belts lengthwise.

North of the residential neighborhoods made up of 13 different types of houses to accommodate varying income levels--is the group of Government buildings, all being designed by Le Corbusier. The first completed unit is the Supreme Court building. Northwest of the city is the University section where the Engineering College, designed by J. K. Chowdhury, Punjab State Architect, has been completed. On Southeast periphery is the relatively small industrial area.

Design of the buildings was influenced by available materials, chiefly brick, and by the climate.

All house types have the following elements: a nucleus of rooms suitable for period of maximum heat with small openings but always permitting cross ventilation: verandas for sheltered living and sleeping during monsoon period; a

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Journal of Housing

Israel's Expansible House May 1956

ISRAEL'S EXPANSIBLE HOUSE

assures basic shelter now, amenities later

HAROLD ROBINSON, Housing Adviser for the International Cooperation Administration's operations mission to Israel, describes how the Israel government is attempting to stretch its home-building material, time, and money to overcome severe housing shortages. An "expansible house" design is a device being currently used. Six house types have been developed and are described below. Mr. Robinson was director of the Massachusetts State Housing Board from 1948 to 1951. Earlier he had been in federal housing service as a lawyer for more than ten years.

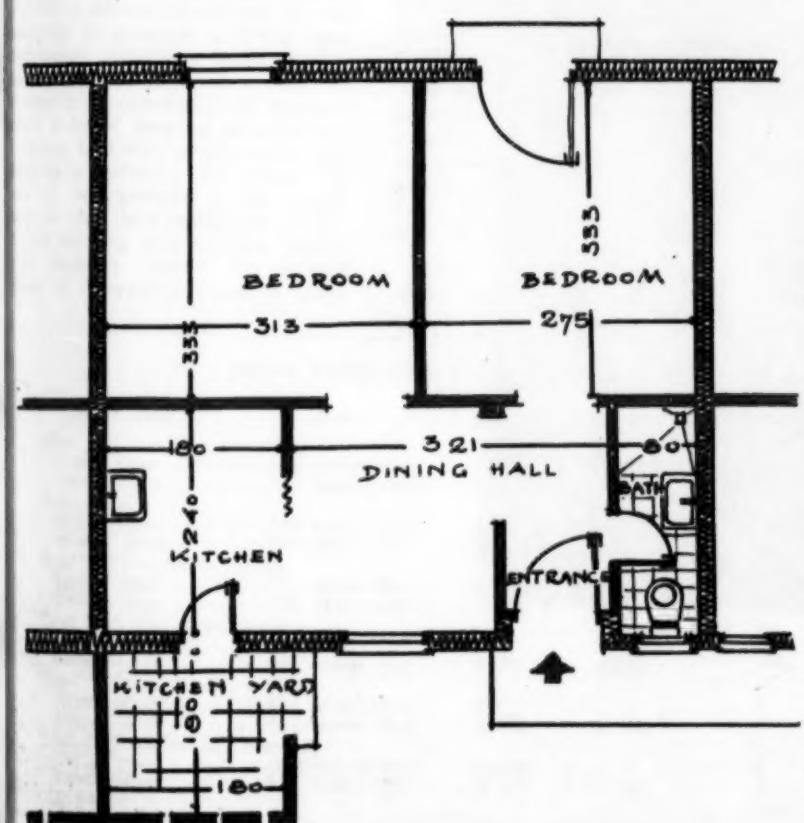
The problem of building less housing, but better housing . . . or more housing, but less adequate housing, is not one peculiar to Israel but prevails in any country where shortages exist. This Gordian knot has never been cut satisfactorily anywhere.

In Israel, the dilemma has been accentuated by large-scale immigration compressed into a limited space of time. From 1948 to 1955, some 800,000 immigrants poured into Israel, doubling the population. In addition to the other necessities of life, the Israel government was forced to provide shelter and community facilities for most of these 800,000 people. At one time, over 16,000 families were housed in tent cities and 80,000 in tin and canvas *maabarot* (temporary shelters), with outdoor latrines and community water faucets. Even today, approximately 6000 families, comprising over 30,000 people, live in the *maabarot*; 18,000 families in wooden huts; and 5000 in social welfare camps. Other thousands are doubled up or are sheltered in abandoned Arab dwellings with inadequate sanitary facilities.

The tents, *maabarot*, and wooden huts provide only temporary shelter. Permanent housing was, and is, needed for new farmers and for workers in new industrial centers, the frontier towns of the Negev desert, and border regions to replace the *maabarot*, to alleviate the overcrowding in the abandoned Arab dwellings, and to take care of natural increases in population. Each year expenditures by the government represent the second largest item in the development budget. Since 1949, over 125,000 permanent dwelling units—rural, suburban, and urban—have been constructed by, or on behalf of, the Israel government.

Unfortunately, the combined pressure of numbers and lack of funds has compelled the government to build housing that is admittedly subminimum in size. In rural areas, new permanent housing constructed by the government has too frequently provided living space of only some 24 to 28 square meters, containing one or one and one-half rooms and a kitchen corner, and housing anywhere from four to ten people. Urban housing has been only slightly larger and lacks the outdoor living space that, in part, can make up for lack of indoor space, due to Israel's benign climate.

This inadequacy of space and amenities has led to resettlement difficulties. As a result of insufficient living space, many families have aban-



At left is a cottage row house in the first stage. It can be expanded by the addition of a second floor that would accommodate two bedrooms and a bath, with the first floor bedrooms to be thrown into a single living room space.

doned their rural shelters for the city. The government's town-to-country movement has been seriously hampered and agricultural productivity has suffered, necessitating the addition of over 7500 rooms to existing rural houses.

Fortunately, in 1954, the lightening of new immigration and the improved national economy permitted the direction of more attention to housing, as distinguished from bare shelter needs. For the first time, real thought could be devoted to space needs and improved amenities and a start was made, at least in the case of urban housing, toward the design of a so-called "expansible" unit, which could be enlarged at a later date with a minimum of disturbance of the existing structure. These new designs should assist immeasurably in preventing the creation of slums and in permitting planned expansion of the individual units to meet future needs.

Expansible Design

In Israel, as elsewhere, the problems of design were manifold. Since the second phase, or the enlarged housing, might not materialize for as much as five years, one basic requirement was that the initial phase provide a self-contained unit. It was essential to produce a living unit containing minimum basic shelter and shelter requirements within the limited cost permitted, with a maximum area of sleeping privacy and a dining hall that could not be utilized as a bedroom. To reduce the cost of enlargement, it was necessary to keep to a minimum the required interior and exterior structural changes during the second phase of construction and to leave plumbing facilities undisturbed. The changes had to be such, too, that the family would not be disturbed during the work of alteration. Another prerequisite, because of the varying sizes of the families to be housed, was interior flexibility in the first as well as the second phase. Of necessity, the solutions reached represent a compromise.

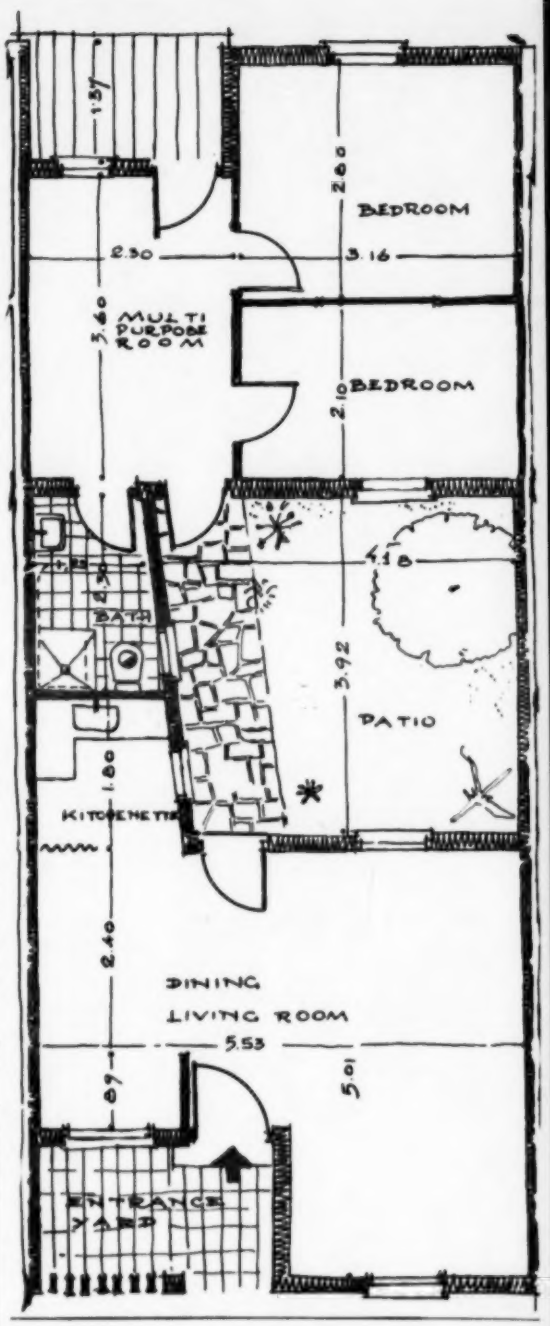
Four different designs of expansible dwelling units have been developed. They range from the one-story row house to the multiple-unit, four-family building and permit a variety of interiors and exteriors. Provision has been made for expansion, both vertically and horizontally, depending upon the type of structure and the form of construction. The table below details the different house types, sizes, initial costs, and expansion costs.

Flexibility of interiors was as much sought after in design as additional square footage in the second stage.

In the one-story row house unit, the first phase contains living-dining space, two bedrooms, kitchen, and toilet and bath. In the second stage the only change is the addition of an ell containing an additional bedroom to form one side of a courtyard.

In the patio house, the partition between the two bedrooms can be removed to provide adequate living room area, with two bedrooms and a multi-purpose room added to form, at the same time, the fourth wall of the interior patio.

The type "B" one-story row house, which expands upwards to form a



Above is the "patio house" in the fully expanded design. In its first stage, the right half of the dining-living area is divided into two bedrooms, with a dining nook overlooking the entrance yard and with kitchenette and bath in the same locations. The expansion costs will run to $1500 and increase living space from 358 square feet to 656 square feet.

HOUSE TYPES, SIZES, COSTS

House Type	Area	Estimated Cost	Estimated Cost of Addition
Type "A" row house, one-story			
Initial stage	460 square feet	$1900	
Second stage	613 square feet	$2700	$ 800
Patio house			
Initial stage	358 square feet	$1500	
Second stage	656 square feet	$3000	$1500
Type "B" row house, cottage			
Initial stage	353 square feet	$1600	
Second stage	722 square feet	$3100	$1500
Type "G" row house, cottage			
Initial stage	410 square feet	$1700	
Second stage	820 square feet	$3300	$1600
Type "C" four-family, two-story			
Initial stage	453 square feet	$1800	
Second stage	677 square feet	$2900	$1100
Type "D" four-family, two-story			
Initial stage	525 square feet	$2100	
Second stage	677 square feet	$3000	$ 900

Above, left—three of the people responsible for the expansible house: A. Glikson, chief, planning and design, housing department, ministry of labor; the author, Harold Robinson; and Yehuda Tamir, assistant director of the housing department. Right—ministry officials on a tour of an expansible house settlement in Beersheba.

cottage type row house, changes, in one instance, from two small bedrooms to an adequate living-dining area, with two bedrooms, a multipurpose room, an additional bathroom forming the second story.

The units in the four-family, two-story dwelling increase from two bedrooms, dining niche, kitchen, and bath to three bedrooms, living room, enlarged dining area, kitchen, and bath.

In most instances, original partitions can be removed to insure larger living area or can be left undisturbed to permit more bedrooms and greater privacy of sleeping.

Coordinating Expansion

While individual expansion was kept in mind during design, expansion is more efficient and economical if coordinated by two or more owners. Thus a joint contribution toward the cost of the party wall would be possible, avoiding construction difficulties and arguments and achieving a more harmonious final effect. This need for coordination is particularly apparent in the case of the two-story, four-family house, which necessitates the expansion of a first floor unit as a condition precedent to the enlargement of the upper story. Governmental assistance by way of technical advice and the stimulation of coordinated effort may well be necessary and certainly would appear advisable.

It is expected that a considerable amount of time will normally elapse before expansion. Which means that the family must live, for a time, in cramped quarters and may be forced, by the pressure of inadequate space, to construct some temporary form of expansion, which can soon result in slum conditions. To prevent this eventuality, the government can have recourse to two measures: (a) a contractual prohibition in the purchase money mortgages and (b) cooperation of local governments in refusing building permits, except in accordance with the original design. Both approaches will require firm action and will raise administrative problems.

Financing

To insure earlier, and less expensive, enlargement, it has been suggested that the Israel government initiate a package plan of (1) monthly savings toward the cost of the materials needed for the expansion and (2) a program of supervised, aided self-help to furnish the labor for the expansion. Such a plan is now under consideration.

The cost of expansion ranges from the $800 for the one-story row house to the $1600 for the larger cottage type, row house. Generally speaking, the labor involved in the expansion will represent 45 per cent of the cost of the expansion. If a program of aided self-help can be devised and instituted, savings of $350 to $720 are possible. Using the one-story, row house as an example, the cost of extension can be reduced by self-labor to less than $450. Over a five year period, to meet this cost would require average monthly savings of $7.00—a sum which, at the moment, will militate against such early expansion without some provision for an extension of the government mortgage.

"Shell" House

As opposed to the expansible house, there is the so-called "shell" house, with which the Israel government is also experimenting. In this type of structure, the exterior walls include the maximum space intended but the interior lacks some interior plastering, some floors are untiled, and at least one partition is temporarily omitted. In the case of the Eastern immigrant, with his larger family and, therefore, greater need for living space, this type of structure meets the immediate demand much better than the expansible house. Moreover, it avoids the necessity for changes to the physical structure, as required in the case of the expansible house, and needs interior finishing only. Its disadvantages are the added initial expense, the possibilities of the creation of an interior slum, and the lessened pressure for completion.

Increased immigration from North Africa is requiring more housing without increased funds. To meet the pressure, a stripped down version of the expansible house is being designed, with the first stage devoid of interior partitioning and plastering. This move reduces the initial structure to subminimum basic shelter and is, in effect, a reversion to the totally inadequate space standards of the earlier housing. The most that can be said for this solution is that shelter from the elements is provided.

Alternatives?

The alternatives to either of these types of housing are either temporary housing, lowered costs of construction, or less housing. Temporary housing poses future problems of replacement, heavy maintenance expense, and wasted materials . . . and savings are questionable. Lowered construction costs are, of course, the constant aim but there is an irreducible minimum beyond which we cannot go. Less housing is a political and social impossibility.

Presently, the housing department of the Ministry of Labor has adopted the expansible house as its solution. Given proper compliance with original plans, the cooperation of local enforcement authorities, and a program of savings toward materials, accompanied by aided self-help labor, the expansible house should provide a partial solution to this vexing problem.

garden, rooftop, or backyard for outdoor living or sleeping during hot dry weather. Even the row houses for the very lowest income include these elements--plus bath and toilet facilities.

The Governor's Residence and Assembly building will be the next units built in the Capitol complex.

HOT HUMID AREAS

5. Lauster, K. C. Nepal's water supply problems viewed by an American engineer. (In Civil engineering, Apr. 1956, vol. 26:4, p. 226-228; with photos.)

Population: (Katmandu, city and immediate vicinity) 140,000

Climate: 85 F°- 35 F°

Rainfall: 58"

The importance of water supply in housing probably justifies inclusion of this article.

The author was a member of the American emergency team sent to East Pakistan at that government's request to help combat the effects of unprecedented floods on the nation's health. On his way home, while in New Delhi, he was requested by officials of Nepal to visit that country relative to problems caused by flood damage to water supplies. He was recently assigned to the Federal Civil Defense Administration at Battle Creek, Mich.

The water supply of Katmandu, capital city of Nepal, and in the Katmandu Valley generally comes from three sources--the Balaju supply, the Maharangunj supply, and a relatively small supply in the southwestern part of the metropolitan area. The first of these, and the largest, comes from three dams located about six miles from the central reservoir, where a filtration plant is being constructed. A 6-inch pipe brings water by gravity from dams to about three miles from filtration plant and at an elevation 50 ft. above the plant. From that point water flows in 12-inch pipe to filtration plant. The normal flow is 3.25 cu. ft. per sec. but is reduced by 1/3 during dry months of April, May, June. Another source being developed will bring normal total to 3.75 cfs. or about 102,000 gals. per hr. One of the chief functions of the filtration plant is to remova mica, which is extremely irritating to intestinal tract of humans. The Maharangunj source, producing 25,000 gallons per hr., is similar to the Balaju, and its filtration plant is also in process of construction. The third water supply comes from springs through 4 miles of 4-inch pipe, with a drop of 350 ft. This serves a small area, including Rabi Behwan, where the Americans live.

Since all the water flows from mountains into the city one might expect the supply to be dependable. This might be so except for the fact that during the dry season when water supply is about one third below normal and is essential for

growing crops, farmers near pipelines sometimes break pipe and allow water to run on their fields.

The chief problems are(1)to eliminate waste caused by hydrants without valves, leaking valves, broken pipes, etc.; (2) to remove mica; (3) to increase quantity of supply, especially during dry period. This might be done b wells to supplement surface supply. Filter plants now being built will solve second problem.

In the rural areas and villages water is generally obtained from springs, dug wells, tanks, or streams. Some springs have been well developed and are sanitary. Dug wells generally 6 ft. or more in diameter have no top and water is drawn by pail and rope. The water quality is consequently poor. Depressions in the ground which capture surface runoff or overflow from springs are called tanks in Nepal. We would call them ponds or pits. Water in these tanks is used for washing clothes and bathing, and if it is the only water available it is used for all purposes, including drinking. Rivers are also used for water supply.

As one would expect, filth-borne diseases are rampant. Cholera is the principal killer but typhoid, dysentery, and the diarrheas abound.

Many of the dug wells could be made entirely satisfactory from the sanitary viewpoint by cleaning to remove foreign matter, improving the drainage in their immediate vicinity when necessary, and providing a tight cover with one or two pumps installed in the cover. For wells of heavy usage, two or more pumps should be provided.

Some tube wells have been installed in this area and are probably the only sanitary-type wells in the country. They are generally 1 1/2 inch pipes with 12-foot long gauze screen in the waterbearing formation. Depths vary from 30 to 250 feet. In depths of less than 80 feet, water has bad taste, probably due to excessive iron. The wells are generally artesian, and can be pumped with a suction pump. Suction pumps with a cylinder of 3 1/2 inch diameter are used. Since many parts of these pumps wear out frequently, some research is necessary to find out why.

The cost of putting in one of these wells at Tarwanipur was as follows

Item	Rupees
Screen, 1 1/2 in. x 6 ft., two @ 1 3/4 rupees each.....	90
Pump, Maya No. 6, one.....	25
Pipe, of 1 1/2-in. diameter, 140 ft. @ 1 3/4 ruppes per ft.....	245
Platform, lump sum.....	25
Cartage, lump sum.....	25
Drilling, 152 ft. @ 1 rupee per ft.*.....	152
Total cost in Indian rupees.....	552**

* For wells less than 100 ft. deep, drilling costs are 1 1/2 rupees per ft.

There is much to be done to improve living standards in Nepal, but any improvement in living standard must be based on sanitation.

** Value same as Indian rupee, i.e. $.2102

III. SPECIAL ARTICLES

(Lahore) 120°-29°F
Climate: (Karachi) 118°-39°F
(Lahore) 18"
Rainfall: (Karachi) 8"

6. Pakistan. Planning Board. The first five year plan, 1955-60 (Draft), Vol II, Part 2. Karachi, The Board, May 1956. 1082 pages. Mimeographed.

This report in mimeographed form has been officially issued; the printed report is expected soon.

Chapter 25: Housing and Settlements.

Introductory: This section explains that by Housing is meant housing plus environment-schools, community centers, churches, community services, public utilities, etc. Estimates of cost however in this study exclude cost of buildings required in special fields, e.g. hospitals, schools, etc., which expenditures are included in the scheme of which they are a part.

There follows a page of reasons why good housing and environment are essential both from social and economic points of view. Under the latter it is pointed out that 50,000 houses a year supplied with public utilities would provide thousands of full-time jobs.

Problems and Development Since Independence: Housing conditions always have been bad due to poverty; since Independence this has been aggravated by an influx of refugees, increase in population, and expansion of towns. Refugees in 1951 numbered 10% of the population; housing however, was helped by the fact that refugees could occupy evacuee properties, where these existed. The number of houses depends on family size; many large patriarchal families are splitting into single units, as industrialization and urbanization take place. It is estimated that population increase of over one million means an additional need of 200,000 houses a year; the need for replacement may mean an increase to 300,000 or 400,000 houses a year.

Bigger Towns: The greatest need for housing in in the larger towns, and these are not only Karachi, Dacca, and Lahore but the former small towns to which industries and port development have brought growth. Housing is also needed at new development projects, e.g. Karnafulli and Warsak, and in areas newly opened to cultivation, e.g. Thal and Abbasia. The housing situation has been worsened by losses through floods, and bad maintenance of evacuee properties.

Private enterprise development has been much higher since Independence. At present monetary and non-monetary investment combined may be greater than 250 million rupees* per year and is still increasing.

The Government has spent about 150 million rupees since Independence for housing to accommodate "tens of thousands" of refugee families. In addition, a major program to house civil servants of the Central & Provincial Governments and employees of railways, ports, and postal, telephone, and telegraph services has been carried out. Government also has provided houses in areas newly colonized or at sites of other development projects. All together, public expenditure on houses has been about 300 million rupees between 1947 and 1955, mostly during the later years. In addition, 70 to 80 million rupees have been spent on community facilities such as water supply and sewerage for Karachi; sewerage for Dacca, and several town improvement schemes, including a largr one in Lahore. Government expenditure on houses and settlements probably has been 370 to 380 million rupees since Independence with a maximum of about 100 million in any one year.

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* Pakistan rupee = $.11. (The Indian rupee is more--about $.2102)

There is still a serious housing shortage; in all towns there are a large number of homeless families. Older parts of towns are grossly overcrowded; public services and buildings are totally inadequate. New suburban building is often of bad design and construction, and has used expensive materials; and the plan of land use has been poor. Towns are growing without adequate town planning.

There is a shortage of community buildings such as markets; villages are growing with no better town planning than they had centuries ago.

Problems have been worsened by absence of an over-all settlements policy, absence or inadequacy of topographical maps and aerial photographs, scarcity of trained personnel, and inadequacy of house-construction-finance planning. Legislation for land use, construction standards, etc., are also inadequate; there is no clear-cut authority for resolving problems, or even for special aspects of these problems, such as water supply provision.

The purpose of the proposed program is (a) to determine a suitable and consistent housing program, in a framework of a national housing policy and (b) to devise arrangements for its application.

Policies, Plans, and General Projects. Targets based on need are not possible since, assuming a house to cost Rs 4,000, to house the annual increase would cost 1,000 million rupees. To maintain existing houses would be even more costly, and with all this expenditure the needs of the present homeless would not be met. Resources to cover needs are not available.

If the wrong steps are taken now--ugly buildings erected, towns planned wastefully, etc.—it will have a bad effect for decades. It is relevant that most houses are built by individuals, not Government. Government can assist, and regulate private housing; it can experiment, but it cannot control most houses that are built.

The program proposed is based on the following policies and priorities: (a) designed to mobilize labor, funds, and physical resources of the people who will own the houses; Government to provide ony those resources which individuals cannot, and then gradually step out; this will result in largest possible number of houses within limited resources of Government; (b) Government role in surveying, planning, designing, and experimentation can have effects greater than those of physical resources it can provide; with careful planning at all levels--center, provinces, municipalities, villages--it should be possible to avoid mistakes; (c) Provide experimental and educational programs over five years--to find best and cheapest solution; (d) planned to meet present and future needs but built only to match present needs; (e) no program can meet more than a fraction of needs, therefore priority given to most indispensable schemes; (f) large public buildings or costly government residences postponed until progress made in housing.

Only minor expenditures are to be made and only for research and surveys of needs and resources; topographical surveys are necessary in the early stages and these so that the building will progress better in the Plan stage.

Central Government itself as well as private enterprise will need expert advice in formulation of policies--policies as to land use, building materials, etc. Probably the building of luxurious houses should be prohibited.

It is estimated that the proposed program would require 1500 architect-designers as well as other specialists, if they were to design individual buildings and settlements separately. This is impossible, so standard designs for various types by such experts as are available is indicated. In order to suit different localities these standard designs should include not only basic types of structures but also parts of structures which might be combined in different ways to meet specific cases. This would make possible standardization and prefabrication of different material, thus reducing cost, and skilled labor hours.

Experimental centers should be established at Lahore, Dacca, and Karachi. Results of experimentation should be widely publicized by means of seminars on national and regional basis, teachers and workers for local Village Aid organizations, exhibitions and lectures, films, etc., and publication of a bulletin. Courses--day and evening--for the training of skilled workers should be established. There should be established two schools for training in architecture and planning. One should be at Lahore, and one at either Dacca or Rajshahi. The one at Lahore could use facilities of Engineering College there. There is proposed, too, a course in Management of projects, and the term Management here means the management of the construction (not as in the U.S., where it means administration of a project after construction). Foreign experts should be employed for this "Management" for a time while they train Pakistanis. Likewise a few Pakistanis should be sent abroad to study methods of construction management.

A survey should be made of the country's need of building materials, and a study should be made of the possibility of local production of more, better, and cheaper materials, of regulations for their use, and policies as to their importation.

A Public Housing and Settlements Programme. Some of the work can be left to private enterprise, e.g. some of the house construction, but the preparation of the site, water supply, sewerage, etc. must be done by Government.

Special provisions must be made for housing of refugees which is a numerous class--but this does not mean that they should be physically segregated. In the new administrative centers at Karachi, Lahore, and Dacca there is need of housing for civil servants.

The Village Aid program will assist in rural areas. Experts of the Housing and Settlements Department will advise the Village Aid organization.

The housing program as discussed in this chapter is likely to cost about 771 million rupees.* Housing to be built must be related to the income of the user, and in general it should never be more than twice the yearly income of the occupant. Very low income groups cannot afford houses costing in money twice their income, but they may be able to obtain an equivalent house by contributing labor. No official income figures exist, but agricultural workers' incomes probably range from Rs 120 to Rs 450. Landowners' incomes range from Rs 150 to several thousand rupees a year. They can afford houses costing Rs 300 to Rs 10,000. It is roughly estimated that in the towns 30% of the families have less than Rs 500 per year; 30% Rs. 500 to 1000; 30% Rs. 1000 to 1500; 5% Rs 1500 to 3000; and 5% more than Rs 3000. The maximum cost for these groups is as follows:

* See Expenditure table herewith.

Table 2

Estimated public expenditure on housing and settlements, 1955-60

(Million rupees)

Preparatory		
Survey of needs and conditions	...	1.2
Topographical survey	...	4.0
Preparation of policies	...	1.5
Designing of projects	...	6.0
Experimentation	...	1.5
Education programme.	...	7.0
Building materials studies	...	1.0
Total		22.2
Public housing projects		
Rural housing and community facilities:		
Water supply	... 36.5	
Other projects	... 6.0	...
		42.5
Improvement of existing towns	...	10.0
Community facilities in existing towns:		
Karachi water supply	... 70.0	
Dacca water supply	... 5.0	
Chittagong water supply	... 7.0	
Other towns water supply	... 20.0	
Karachi sewarage and drainage	... 25.0	
Dacca sewerage and drainage	... 26.5	
Chittagong sewerage	... 10.0	
Other towns sewerage and drainage	... 3.0	
		166.5
Provision of plots in new settlements	...	170.0
Self-help housing	...	14.0
Construction of nucleus houses	...	68.0
Construction of low-cost houses	...	35.0
Construction of higher-cost houses	...	18.0
Total	...	524.0
Refugee housing projects		
Amelioration of conditions	...	5.0
Completion of present programmes	...	10.0
Provision of plots in new settlements	...	100.0
Self-help housing	...	10.0
Construction of nucleus houses	...	30.0
Construction of low-cost houses	...	7.0
Construction of higher- houses	...	3.0
Total	...	165.0
Government-owned houses	...	50.0
Administrative centres	...	10.0
Grand Total	...	771.2

Table 3

Expenditure on the housing and settlements programme by executing authorities and by years, 1955-60

(Million rupees)

Units	1955-56	1956-57	1957-58	1958-59	1959-60	Total, 1955-60
ast Pakistan	11.24	39.18	69.31	83.18	92.09	295.00
est Pakistan	19.44	41.98	64.11	76.53	83.84	285.90
rachi	13.30	23.20	28.75	34.08	35.77	135.10
ntre	1.44	7.82	12.88	15.64	17.42	55.20
Total	45.42	112.18	175.05	209.43	229.12	771.20

Table 4

Internal and foreign expenditure on housing and settlements programme, 1955-60

(Million rupees)

Units	1955-56	1956-57	1957-58	1958-59	1959-60	Total, 1955-60
ternal expendi- re	29.79	63.28	104.78	126.21	137.94	462.00
reign expendi- re	15.63	48.90	70.27	83.22	91.18	309.20
Total	45.42	112.18	175.05	209.43	229.12	771.20

Yearly Income of Family	Cost of House	Approximate Cost of Land and Development per House in Column 2	Approximate Total Expenditure on House Building
(1)	(2)	(3)	(4)
500	1,000	700	1,700
1,000	2,000	1,400	3,400
1,500	3,000	2,100	5,100
3,000	6,000	4,200	10,200
5,000	10,000	7,000	17,000
10,000	20,000	14,000	34,000

The housing program is based on these figures.

Some rural problems are beyond Village Aid organizations--such as water supply. The "Plan" will spend Rs 33.5 million to re-sink tube wells. Also in rural areas the scheme provides for building experimental houses in different areas, and experimental installations of various types of drainage schemes, and community facilities.

Improvement of Existing Towns: Practically all of these need improvement but only 10 million rupees allotted to this since until the towns are better organized for this improvement and town plans made, the spending of more money is not justified. Water supply and sewerage facilities especially are needed. A water supply scheme for Karachi has been prepared and is expected to be complted by 1960, and there has been allocated for it 70 million rupees during the Plan stage and 107 million rupees for completion.

There is recommended a coordinated survey of the new Federal Capital and Karachi as a basis for a joint water system. A Karachi drainage and sewerage system is now being constructed.

New Settlements; It is planned to concentrate on providing those basic community utilities services which people cannot supply for themselves. Given these, some can build their own houses; others must be aided at least with building materials; others must have at least the nucleus of a house provided them to which they can add later; still others must be given complete houses, built to varying standards. Government should transfer houses to private ownership as soon as possible. This would give Government funds for more housing and have a good effect on the morale of the owners.

Units of not less than 100 families are thought most economical, and such units may be developed into organized communities. The largest scheme in this program is for 150,000 plots in units generally of several hundred plots, open to virtually every one.

The cost of all water supply, sewerage, highways, etc., is reckoned at Rs 1,000 per plot. Provision for schools, health centers, etc., has been made elsewhere--not in the Housing Section.

Under the self-help program the Plan includes distribution of materials for 20,000 houses costing about Rs 700 per house. Assistance is to be given in materials, technical assistance, and a few days' work of skilled workers. Materials are to be in the form of finished parts, not raw materials such as cement and lumber.

Another group will need a "nucleus" built for them which will consist of a compound wall with its door, one room with veranda, one latrine without roof. Eventually such a house will have three rooms, kitchen, bathroom, store room and covered latrine. At an average cost of Rs 1240 there has been provided the construction of 55,000 nucleus houses.

For another group there has been provided 14,000 two or three room houses at an average cost of Rs. 2500. These will permit later expansion. For still another group there is to be provided 4500 larger houses costing Rs 3000 to Rs 6000. These two can be enlarged later.

All this indicates a need of designing houses which can be built in stages. This applies too to community buildings.

A house consists of rooms, covered veranda, and open courtyard surrounded by compound wall.

Industrial Workers' Housing: It is not recommended that factory owners should own the houses of employees though they might assist and subsidize. Most of the housing in the Public Housing Program will be in urban areas where industry is expanding and will serve industrial workers. It is proposed that about 130,000 plots in new settlements be located near existing factories. Until the Government program is adequate it is recommended that employers' present program should not be reduced. Where absolutely necessary Government might assist employers with advice and 10-year loans.

Industrial trading estates should be developed and industries should contribute to the cost of settlements for workers. The cost of development of the land for factories and houses might be charged to industries.

Miners' Housing: This is similar to industrial housing except that mines are away from urban areas. Until it is able to supply the need of community housing it is recommended that Government provide loans to owners to cover the cost of land and land development, provided mines have a sufficiently long life expectancy.

Refugee Housing and Settlements Programme: Their housing should be part of a general program but since there are so many still homeless or badly housed a separate program has been established. After 1960 is hoped that there will be no need of such a separate program for regugees.

All these various types of development schemes, i.e. plots, nucleus houses, building materials, and complete houses, must be provided but in different proportions from those in the general program; there are also some special "refugee settlements" where special measures had to be applied to complete them as soon as possible. Although these need great improvements it is thought best to spend money to house those at present homeless rather than improve badly conceived settlements, except in cases where conditions are so bad that minor assistance must be given.

The satellite towns started by the former Punjab Government are different from other settlements. They are well built, with due regard to public health. They require only some change in arrangements such as access roads, provision of some commercial and industrial sites, cutting large plots into smaller, etc. They should be made selfcontained urban communities. The cost of this is estimated in the Plan.

In the plan for refugee housing is a provision for 5000 small shops in specially designed bazaars. These shops are to cost about Rs 1000 each and could be rented or sold to refugees to provide employment for them.

Government-owned Houses: These are to house civil servents who are moved from area to area. The houses should not cost more than twice the occupants' salary but houses for other salary ranges should be mixed up with these to avoid an exclusively civil servant settlement.

Effects and Return of the Government Programme: The total government program recommended would yield the following results:

(a) Construction of 53,500 rural tube wells and making other improvements in rural settlements;

(b) Making improvements in existing cities;

(c) Providing community facilities for several million people in existing towns and cities;

(d) Preparation of 250,000 plots in new settlements, of which 100,000 will be for refugees;

(e) Provision of building materials for self-help housing for 35,000 families including 15,000 refugees;

(f) Building 80,000 nucleus houses, including 25,000 for refugees; and

(g) Building 27,250 houses, of which 17,000 will be low-cost houses (including 3,000 for refugees), 5,250 will be higher-cost houses (including 750 for refugees), and 5,000 will be government-owned.

Out of the 250,000 plots proposed, Government would assist in house construction on 142,250; individuals would build their own houses without government assistance on the remainder. A large part of the total Government expenditure in this program would be recoverable eventually, but expenditures on surveys, design, and education would not be recoverable. In the rural program money spent on the houses would be recoverable, but not so expenditures on community facilities. Improvements in towns would not be recoverable during the Plan period, but in future, slum clearance and development expenditures might be so well planned and administered as to yield a profit. Also, in larger towns, money spent on water supplies, etc., might be recoverable through rates.

Of money spent for the creation of new settlements the land development costs of only those plots allocated to families with higher income should be recovered. Government or industry should bear costs of land development for lower income families. Material costs for self-aid housing should be partly recoverable, as should cost of nucleus houses. In all other cases the total cost of houses should be recovered over a period of years. It is estimated that eventually about one half, of the total expenditure on public housing will be recoverable, and about the same proportion in the refugee program.

Administrative Centers: These include the Federal Capital, the Provincial Capitals, Division and District headquarters and army depots. Historically, the urban centers, lacking industry and organized communications grew around administrative centers only. The situation is now changed, but administration is still a great factor, with industry and commerce developed to a high degree only at the ports as yet. Changes in the administrative centers is going on. Until administrative organization takes clear shape it would be premature to construct special buildings. It is suggested that with certain exceptions, construction on these be delayed until after 1960. There is provided for in the Plan a fund of Rs 10 million for survey, program design, and acquisition of land.

A new Federal Capital might cost Rs 500 million in all, and is feasible only if spread over 20 years or more.

Administration and Implementation: Up till now housing problems have not been well co-ordinated. The largest program--for refugee housing--was planned in the Ministry of Refugees and Rehabilitation and executed by various agencies such as Public Works Department, District Engineers, and local bodies. Housing developments for civil sevants were usually executed

by Public Works Departments. Several departments such as Posts and Telegraph, Port Authorities, etc., carried out their own programs.

The need of one over-all body is evident. The housing job represents nearly 10% of public investment, and requires a separate Ministry for Housing and Settlements, but since there is no major organization specializing in housing, no tradition in housing projects, and no cadre of experts in the field, there is proposed a modest beginning with a Department of Housing and Settlements. As activities progress this might acquire Ministry status. The Department in the meantime might be placed under the Ministry covering Social Welfare, Health and Education.

In the Provinces this Department should be either in a Ministry of Social Welfare or a Ministry of Local Self-Government. The present local agencies carrying out housing would transfer gradually their housing responsibilities and staffs to the Housing and Settlements Department. At the local level the Housing and Settlements Department would work closely with local authorities and other bodies (e.g. trading estates), issue manuals of advice concerning urban development plans, etc.

One of the difficult problems in the implementation of the housing and settlements program is a shortage of qualified and experienced men to develop plans and design houses. Pakistani engineers have built houses and can continue to do so, but designs should be improved. This requires expert assistance; the details of the designs could be worked out by arrangement with offices in foreign countries. It might be difficult to get soon enough the services of planners and designers of the type needed. If so, the delay in the first years of the Plan might be offset by speeding up the construction during the last two years of the Plan.

A Cadre of Housing and Settlement Officers: The Plan requires much preparatory work and will continue to expand as resources increase. Engineers employed in traditional civil works do not fit well in the Housing and Settlements Department. The approach needed here is readiness to make experiments, to use local materials, to change designs according to climatic and social conditions which vary with the region, and to keep constantly in view the resources of the people to be housed.

It is suggested that like other countries, Pakistan establish separate cadres consisting of architects, civil and sanitary engineers, as well as experts in the social and economic field, and employ private agencies. Salary scales, etc., should be comparable with those of engineers in the existing civil works departments. Foreign experts should be engaged on short-period contracts. Young engineers should be recruited and trained for the new Department. The formation of Schools of Architecture and Planning, provided for in the Plan, will help.